



Physical Rehabilitation & Sports Medicine
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CASE STUDY

A 48 year old male with back pain and radiculopathy

A 48 y.o. male was injured 5 weeks ago while lifting. He felt sudden, sharp, back pain and was unable to stand straight for a few days after the injury. A few days later he started feeling right LE pain. Present status: patient reports right-sided low back pain with radiating pain and paresthesia into the right S1 dermatome to the foot (VAS: 8/10). Patient scores 40% on the Oswestry Disability Questionnaire indicating moderate to severe disability (with 0% meaning no disability and 100% meaning bed bound or exaggerating symptoms). Patient scores 12 on the Fear-Avoidance Beliefs Questionnaire for low back pain (low fear and avoidance beliefs). His LBP is constant while his right LE symptoms are intermittent. His right LE pain is provoked with sitting (pain starts after 15 minutes) and bending. His right LE pain decreases with walking and standing (after 10 minutes). Patient also reports that he feels very stiff when getting up from sitting (problems with curve reversal from kyphosis to lordosis). After standing up from sitting his LE pain lingers for a few minutes before it subsides. There is most pain in the morning. Coughing and sneezing are painful (LBP). Patient denies any bladder or bowel incontinence and he doesn't complain of urinary retention. There is no night pain and no unexplained weight loss. Patient also denies any weakness in the right LE. His Past Medical History is unremarkable.

Interpretation after Subjective:

- There are no red flags
- Since pain is radiating below the knee there is most likely a nerve root involvement.
- When pain radiates below the knee the following McKenzie diagnosis can be considered:
 - Adherent Nerve Root: this diagnosis is unlikely in this case since patient's pain started only 5 weeks ago. Adherent nerve root takes at least 8 weeks to develop.
 - Nerve Root Entrapment: also this diagnosis is not likely since the patient's pain started only 5 weeks ago. Nerve Root Entrapment takes at least 8 weeks to develop.

- Symptomatic Spinal Stenosis: this diagnosis can be ruled out since patient complains of increased pain with flexion activities (sitting and bending) and feels decreased pain with extension activities (standing and walking). In case of symptomatic spinal stenosis the opposite would be expected.
- Chemical Inflammatory Condition: this diagnosis is improbable since his LBP is constant, but it does fluctuate depending on activities.
- Non-mechanical LBP: this case study is an example of mechanical LBP since some activities increase pain while other activities decrease pain
- Posterior Derangement: this is the most likely McKenzie diagnosis for the following reasons:
 - ❖ Patient reports pain and stiffness with standing up from sitting (problems with curve reversal from kyphosis to lordosis).
 - ❖ There is an active lesion characterized by rapid change (pain increase after 15 minutes sitting and pain decreases after 10 minutes walking).
 - ❖ His pain increases with bending activities (sitting) and decreases with extension activities which points towards a posterior derangement with extension as the treatment direction.
- The low score on the Fear-Avoidance Beliefs Questionnaire for low back pain suggest a good prognosis. Ref: *The role of fear-avoidance beliefs in acute low back pain: relationships with current and future disability and work status Julie M. Fritz, Steven Z. Georgeb, Anthony Delitto; Pain; October 2001 (Vol. 94, Issue 1, Pages 7-15)*

Objective:

Patient's LBP and right LE pain are provoked after sitting for 15 minutes for the history taking portion of the evaluation. Patient demonstrates a poor sitting posture. After we improve patient's sitting posture with a lumbar roll (Fig 1) his LE pain abolishes after 5 minutes.

Functional examination: lumbar flexion has a moderate movement loss with reproduction of LBP and LE pain. Lumbar extension has a moderate movement loss with LBP reproduction. Left lateral flexion has no movement loss with no pain. Right lateral flexion has a minimal movement loss with right-sided LBP. The Slump Test is positive. The SLR test is limited on the right (with increased right LE pain). Deep Tendon Reflexes, strength and sensation are all symmetrical and WNL. SI joint pain provocation tests are negative.

Repeated flexion in standing increases his LBP and produces his right LE after 6 repetitions.

Repeated extension in standing increases his LBP and produces his right LE pain after 4 repetitions.

Repeated extension in prone (Fig 2.) abolishes his LE pain and decreases his LBP after 20 repetitions. (This phenomenon is called centralization. It predicts a good prognosis for treatment).

Reference: *Skytte L, May S, Petersen P; Centralization: Its prognostic value in patients with referred symptoms and sciatica Spine; 30:E293-E299, 2005.*

Interpretation after the functional examination:

We will treat patient towards the extension direction for the following reasons: Patient's LE pain decreases with extension activities (walking and standing). In addition patient's pain centralizes (abolished LE pain and decreased LBP) with repeated lumbar extension in prone after 20 repetitions. Patient also demonstrates an increased lumbar ROM, an improved SLR test and less LBP with the Valsava Maneuver after performing 20 prone extensions.

Reference: *Long A, Donelson R, Fung T; Does it matter which exercise? A randomized control trial of exercises for low back pain. Spine; Dec 1;29(23):2593-2602, 2004. (NB: direction of preference is defined as exercising in the direction that decreases, abolishes or centralizes the pain: this direction can be flexion, extension, lateral flexion or rotation). Authors abstract: 'Following a mechanical evaluation all patients who demonstrated directional preference*

(DP)(230/312, 74%) were randomized to receive exercise matched to DP (1), exercise opposite to DP (2) or evidence-based management (3). Over 30% of groups 2 and 3 withdrew because of failure to improve or worsening, compared to none in group 1. Over 90% of group 1 rated themselves better or resolved at 2 weeks, compared to just over 20% (group 2) and just over 40% (group 3). There were further significant differences between the groups in back and leg pain, functional disability, depression and QTF category.'

Treatment

1st visit: patient is send home with only one exercise: repeated extension in prone. He is instructed to perform 10 repetitions of this exercise every 2 hours throughout the day. He is also told to maintain a lumbar lordosis while sitting (with the use of a lumbar roll). This has to be done consistently. To ensure consistency we tell patient to roll up about 4 or 5 bath towels and to leave these in all places where patient sits (at home, in the car and at work). Patient is also encouraged to walk frequently since this seems to decreases his right LE pain and he is instructed to interrupt sitting at least every hour.

Sending patients home with only one exercise has several advantages: Comparable with a scientific study we only change one variable at a time. The effect of this change will be reevaluated on the next visit. In addition having only to perform one exercise helps with patient compliance. During the evaluation this patient experienced the immediate effect of his home exercise: he felt less pain and an increased ROM after performing 20 repetitions. This rapid positive feedback contributes to patient empowerment and motivation. Also, please note that we didn't perform any mobilizations yet since this would make the patient more dependent on his therapist. This 'hands off' approach –only using patient generated forces- also helps to demonstrate the full effect of the HEP. We only start using clinician generated forces when there is no further improvement with patient generated forces alone (please see 3rd visit).

2nd visit: patient returns with no LE pain. His LBP is still rather severe. Coughing and sneezing are not painful any more. He is able to sit for about 30 minutes before his pain becomes severe. Since patient is improving no changes are made to the HEP.

3rd visit: Patient reports no further improvement as compared to last time. Since there is no further improvement we progress the treatment force (same direction): extension in prone with therapist over pressure (with the use of a towel) (Fig 3.) After 15 repetitions patient reports less LBP. His ROM is considerably improved after that. Patient is send home with extension in prone every 2 hours of the day while a family member applies towel over pressure.

4th visit: Patient returns with 80% decreased LBP as compared to initially. There is no LE pain any more. He only reports some right-sided LBP. Patient returns home with the same exercise.

5th visit: patient reports no change as compared to last time. In the clinic we increase the force: extension mobilization in prone (Fig 4). This mobilization brings no further improvement (same pain and ROM). Since he still reports remaining right-sided back pain we decided to start treating him in the frontal plane. The first mobilization we attempt: extension in prone with the hips shifted to the left (to close the right compartment) brings no further improvement (Fig 5) . The second mobilization we attempt: sustained left rotation in flexion (knees to the right) to close the right compartment even more, abolishes his pain. He now demonstrates a full lumbar ROM (free of pain) (Fig 6.). Patient goes home with the extension in prone exercise that he was completing before.

6th visit: patient reports almost no pain anymore and scores 10% disability on the Oswestry Disability Questionnaire (indicating minimal disability). He now has a full lumbar ROM with no pain at end ROM. Repeated lumbar flexion is tested in supine, standing and in sitting. This doesn't provoke pain anymore and the extension ROM is unchanged after that. He is instructed to continue exercising (prone extension in lying 10 reps) 1x/day (prophylaxis). If on occasion he feels increased stiffness with this exercise or increased LBP with daily activities he knows to resume the exercise every 2 hours of the day. Patient is also encouraged to improve his conditioning with aerobic training and generalized strengthening. (Hayden JA, et al. (2005). Systematic review:

Strategies for using exercise therapy to improve outcomes in chronic low back pain. Annals of Internal Medicine, 142(9): 776–785.);

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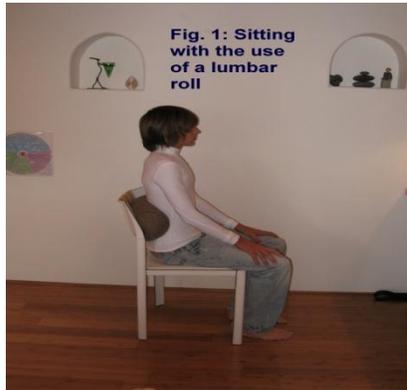


Fig 1. Sitting with the use of a lumbar roll



Fig 2. Lumbar extension in prone



Fig 3: Extension in prone with therapist overpressure



Fig 4. Extension mobilization



Fig 5: Lumbar extension in prone with hips off center to the left.



Fig 6. Left lumbar rotation in flexion (knees to the right)

Thank you!
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